

In re Patent Application of
SERGIO ET AL.
Serial No. 09/994,384
Filed: NOVEMBER 26, 2001

In the Claims:

This listing of claims replaces all prior versions and listings of claims in the application.

Claims 1-7 (Canceled).

8. (Currently amended) A method of reading a capacitive pressure sensor comprising an array of pressure-sensing capacitors ordered in rows and columns functionally connected through row lines and through column lines substantially orthogonal to each other, using a biasing and reading circuit comprising column and row selectors, and a charge amplifier outputting a voltage of the pressure based capacitance of a selected pressure-sensing capacitor of the array, the method comprising:

resetting an output voltage of the charge amplifier;
connecting nonselected row and column lines of the array to a reference voltage while connecting one of an auxiliary capacitor and the selected pressure-sensing capacitor to an input of the amplifier while connecting the other one of the auxiliary capacitor and the selected pressure-sensing capacitor to define a feedback capacitor of the amplifier, the feedback capacitor being discharged by the connection of the nonselected row and column lines of the array to the reference voltage; and

applying a step voltage on the one of the auxiliary capacitor and the selected pressure-sensing capacitor that is

connected to the input of the amplifier and reading the output voltage at steady-state.

9. (Previously presented) The method of Claim 8, further comprising sequentially scanning the pressure-sensing capacitors of the array to obtain a frame of pressure based capacitance values of the capacitive pressure sensor.

10. (Previously presented) The method of Claim 9, wherein the scanning is repeated at a predetermined frame frequency.

11. (Currently amended) A method of reading a capacitive pressure sensor comprising an array of pressure-sensing capacitors connected in rows and columns, the method comprising:

providing a biasing and reading circuit comprising
column and row selectors,

an amplifier, connected to the column and row selectors, for outputting a voltage of the pressure based capacitance of a selected pressure-sensing capacitor of the array, and

an auxiliary capacitor connected to the column and row selectors;

connecting nonselected rows and columns of the array to a reference voltage while connecting one of the auxiliary capacitor and the selected pressure-sensing capacitor as an

input of the amplifier while connecting the other one of the auxiliary capacitor and the selected pressure-sensing capacitor to define a feedback capacitor of the amplifier, the feedback capacitor being discharged by the connection of the nonselected row and column lines of the array to the reference voltage; and

applying a step voltage on the one of the auxiliary capacitor and the selected pressure-sensing capacitor that is connected on the input of the amplifier and reading the output voltage at steady-state.

12. (Previously presented) The method of Claim 11, further comprising resetting the output voltage of the charge amplifier.

13. (Previously presented) The method of Claim 11, further comprising sequentially scanning the pressure-sensing capacitors of the array to obtain a frame of capacitance values of the capacitive pressure sensor.

14. (Previously presented) The method of Claim 13, wherein the scanning is repeated at a predetermined frame frequency.

15. (Currently amended) A system for reading a capacitive pressure sensor comprising an array of pressure-sensing capacitors connected in rows and columns, the system comprising:

a biasing and reading circuit comprising an amplifier for outputting a voltage representing the pressure based capacitance of a selected pressure-sensing capacitor, an auxiliary capacitor, configuration switches for coupling one of the auxiliary capacitor and the selected pressure-sensing capacitor as a feedback capacitor and for coupling the other of the auxiliary capacitor and the selected pressure-sensing capacitor to an input of the amplifier, and an analog-to-digital converter for converting the output voltage to digital data;

an input interface circuit for connecting deselected row lines and column lines of the array to a reference voltage and while coupling the selected pressure-sensing capacitor of the capacitive pressure sensor to the biasing and reading circuit, the feedback capacitor being discharged by the connection of the deselected row and column lines of the array to the reference voltage;

a microprocessor for performing noise filtering and real-time correction of data; and

a digital output interface circuit controlled by the microprocessor for outputting the digital data representing read values of capacitance of the capacitive pressure sensor.

16. (Previously presented) The system according to Claim 15, wherein the input interface circuit comprises row and column selectors; and further comprising a timing signal generator, controlled by the microprocessor, for generating timing signals for the row and column selectors, for the biasing

and reading circuit and for the converter, for synchronizing the operation phases of the circuits.

17. (Previously presented) The system of Claim 16, wherein the waveform generator comprises:

a shift register for cyclically producing the timing signals with a certain frequency; and

a finite states machine, controlled by the microprocessor unit, for configuring the shift register.

18. (Previously presented) The system according to Claim 15, wherein the input interface circuit comprises:

a selection logic circuit controlled by the microprocessor unit for producing selection signals; and

a plurality of connection modules for connecting the deselected rows and columns to the reference voltage, and for coupling the selected pressure-sensing capacitor to the biasing and reading circuit based upon the selection signals.

19. (Currently amended) An integrated circuit for reading a capacitive pressure sensor comprising an array of pressure-sensing capacitors connected in rows and columns, the circuit comprising:

column and row selectors;

an amplifier, connected to the column and row selectors, for outputting a voltage of the pressured-based capacitance of a selected pressure-sensing capacitor of the

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array;

an auxiliary capacitor connected to the column and row
selectors;

configuration switches for connecting deselected row
lines and column lines of the array to a reference voltage and
while coupling one of the auxiliary capacitor and the selected
pressure-sensing capacitor as a feedback capacitor and for
coupling the other of the auxiliary capacitor and the selected
pressure-sensing capacitor to an input of the amplifier, the
feedback capacitor being discharged by the connection of the
deselected row and column lines of the array to the reference
voltage; and

a controller for controlling the configuration
switches.

20. (Previously presented) The circuit according to
Claim 19, further comprising:

an analog-to-digital converter for converting the
output voltage to digital data; and

a digital output interface circuit for outputting the
digital data representing read values of capacitance of the
capacitive pressure sensor.

21. (Previously presented) The circuit according to
Claim 19, wherein the controller comprises a timing signal
generator for generating timing signals for the row and column
selectors.

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22. (Currently amended) A capacitive pressure sensor device comprising:

an array of pressure-sensing capacitors connected in rows and columns; and

a reading circuit for reading the array of pressure-sensing capacitors and comprising

column and row selectors,

an amplifier, connected to the column and row selectors, for outputting a voltage of the pressure-based capacitance of a selected pressure-sensing capacitor of the array,

an auxiliary capacitor connected to the column and row selectors,

configuration switches for connecting deselected row lines and column lines of the array to a reference voltage and while coupling one of the auxiliary capacitor and the selected pressure-sensing capacitor as a feedback capacitor and for coupling the other of the auxiliary capacitor and the selected pressure-sensing capacitor to an input of the amplifier, the feedback capacitor being discharged by the connection of the deselected row and column lines of the array to the reference voltage, and

a controller for controlling the configuration switches.

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23. (Previously presented) The device according to Claim 22, wherein the reading circuit further comprises:

an analog-to-digital converter for converting the output voltage to digital data; and

a digital output interface circuit for outputting the digital data representing read values of pressure-based capacitance of the capacitive pressure sensor.

24. (Previously presented) The device according to Claim 22, wherein the controller comprises a timing signal generator for generating timing signals for the row and column selectors.